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National Priorities Shape Agenda, NSF Head Says

Provost of Rice University since 1986, Neal F. Lane was confirmed in October as Director of the National Science Foundation, where 13 years earlier he had headed the Physics Division. Lane spoke on January 7 with SGR Editor Greenberg. Following is the text, transcribed and edited by SGR.

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SGR. *The fear among NSF's old constituents is that basic research is the loser under President Clinton's emphasis on industrial technology. Mathematicians, for example, complain they're being squeezed into applied directions.*

Lane. It is true that the priorities for the investment of scarce resources for research and education have been established pretty clearly to address certain national needs. In the previous Administration, initiatives were established for research on global change, high-performance computing, and others. And they resulted in *more* money being spent within the agencies on fundamental research, including the NSF. Fundamental research, but research that relates to these broad strategic initiatives. The new Administration understandably has its initiatives, its priorities, and those priorities will certainly determine the investment of R&D money in the future.

SGR. *Are we just dealing with semantic matters when we say "strategic" research, "basic" research, basic research that's directed toward national needs?*

Lane. The words themselves are a problem, because they mean different things to different people. And therein lies some of the confusion about what we're saying here in Washington and what we're hearing from others in these discussions. I use "strategic" in the way that I think is consistent with the history at NSF and with the current planning. And that's that there are certain broad areas—such as the initiatives I just mentioned—that are critically based on research that is of a discovery nature. Unless progress is made in understanding the science and engineering that underlies these initiatives, then they're not going to make progress. So, I don't believe there's an inconsistency. There's plenty of fundamental research to be done, but it's been more directed toward these strategic areas in recent years.

SGR. *What does this mean for the investigator who's interested in important scientific problems but really doesn't mesh well with global change or high-performance computing, or any of the other Presidential initiatives? Is there still a place for this kind of scientist?*

Lane. Absolutely. Putting on an investigator hat—I was one not so very long ago—I think the right approach is to put

(Continued on Page 2)

Dubious Ethics in NIH's Foreign Vaccine Trials

There is no need to go back into early nuclear history to find dangerous experiments inflicted on unwitting patients in violation of traditional standards of medical ethics.

The National Institutes of Health, SGR has learned, is currently financing an $11.5-million vaccine trial in Italy in which 1550 infants received placebos rather than the highly effective pertussis vaccines in standard use in the United States and other countries. The Italian project, documented in records obtained by SGR under the Freedom of Information Act, is a follow-up to a similar NIH-financed pertussis trial in Sweden in which 2600 infants received placebos. The Italian and Swedish trials were completed last year and the results are to be monitored into 1995.

(Continued on Page 5)

In Brief

Scheduled for delivery to Congress and public release on Monday, February 7, President Clinton's budget for fiscal 1995 (beginning October 1) is said to be pretty grim for the R&D agencies—except in comparison to the rest of the government. Situated as a major part of the Administration's cherished investment strategy, the R&D requests, SGR hears, will rise a bit above the inflation rate, while most everything else is either flat or declining. The '95 budget will arrive in four separate volumes, rather than in the weight-lifter format of last year's production—which totaled 1163 pages.

NIH Director Harold Varmus related in a recent speech that in late October he invited Vice President Al Gore to visit the Bethesda, Md., campus, but found, upon encountering Gore during the Christmas holidays, that "he was bewildered by my inquiries about a visit." Varmus said he later found that "the letter of invitation had been slowly passing through Departmental channels and had yet to be sent." Given the bureaucratic constipation that afflicts NIH's Departmental master, Health and Human Services, it is not unlikely that correspondence initiated two years ago by Bernadine Healy when she was the NIH chief is still peristalting through the Department.

Still vacant as the Clinton Administration nears the one-year mark in office: the top research post in the Department of Agriculture, Assistant Secretary for Science and Education. The first choice for the job, Luis Sequeira, formerly of the University of Wisconsin, withdrew from consideration last fall after Clinton announced his intention to nominate him, and then left him dangling for two months without a customary interim appointment [SGR, November 1].

. . . Researchers Must Realize "World Has Changed"

(Continued from Page 1)

forward your very best ideas in whatever area of science and engineering they happen to be, and the Foundation is going to continue to respond to those. But, at the same time, it's important for the investigators to recognize that across all of the agencies, it's likely that most of the growth, in whatever growth there is in research funding—we hope there is growth—is likely to be invested in areas that are the Administration's priorities.

SGR. *That bear some sort of utilitarian label?*

Lane. That are clearly identified as being relevant to some larger national needs. I also want to remind all of us that the President and the Vice President made very clear in their statement on February 22 on *Technology for America's Economic Growth* that one of the three technology goals of the Administration is world leadership in basic science, mathematics, and engineering. That paper said [reading]: "Scientific advances are the wellspring of the technical innovations. The benefits are seen in economic growth, improved health care, and many other areas." That statement makes clear the commitment of the Administration to basic, or fundamental, science and engineering. But it also hints that it is largely because discoveries in basic science and engineering are important to many areas of national need.

SGR. *You're suggesting that the financial growth will be in the direction of applied needs.*

Lane. I think much of the financial growth is likely to be in the strategic areas, as I defined them. Investment is an important part of the Administration's strategy. So, that gives me confidence. But big growth in all the agencies is going to be very difficult for the next few years.

SGR. *There's been a great deal of discussion of what Senator [Barbara] Mikulski [D-Md.] meant in her appropriations report on NSF. She warned that if NSF doesn't get with it on "strategic" research, growth will go to NIST and other agencies. What's your interpretation of this harsh language?*

Lane. The public and many members of Congress are asking very tough questions now about the value of investment in fundamental science and engineering. But Senator Mikulski and her Committee have continued to be strong supporters of the Foundation. The numbers really were pretty good. The net result of the '94 budget process was an 11 percent increase for the Foundation. So, I believe that the message in the report is that this agency is indeed very important to the nation, and that we must be sure that we're investing our funds in the best possible way, that we are accountable to the public for how we're doing that. Also, that we and the community we support articulate why research and education in science, mathematics, and engineering are so important to the country.

SGR. *The most common interpretation was that Mikulski and her colleagues are unhappy with the way the Foundation is managing its resources. They think it should be doing something different from what it has been doing.*

Lane. I would put it a little differently. I think the strongest message is that we have not done as good a job as we should in explaining how we're investing these funds, and how that investment is addressing the needs of the country. That's the strongest message.

SGR. *Explain to whom?*

Lane. Explain to the Congress, to the public.

SGR. *You have ample opportunities for communication with the Congress. There are numerous hearings, personal relations between staffs.*

Lane. I've been here a couple of months. I'm not sure I can answer that with any great understanding.

SGR. *Another interpretation is that Congress understands all too well what the Foundation is doing, and doesn't like what it sees.*

Lane. There are members of Congress who feel the Foundation could do more, the whole federal government, perhaps, could do more to address some of the nation's more serious needs. That's true, and it's incumbent on us to make as clear as we possibly can how we're doing that right now. And if there are things that we can do differently, should do differently, what those are.

SGR. *If you were a Vice President for Research on a big research campus briefing your department heads on the mood and trends in Washington, what would you tell them?*

Lane. To think broadly across all of government in considering their own research programs and what they're going to do and where they're going to seek money—not to focus on any one agency. I would tell them the world has changed, that it's really not business as usual in Washington, that discretionary spending across all government is flat for five years. Any growth anywhere under that envelope is going to be very difficult. It's going to require special justification. And they need to be as helpful as they can to provide that justification. And just step back and think about whether there aren't ways in which they can offer the knowledge they have, the capability, the research infrastructure that they have developed, to address some problems perhaps more broadly, perhaps on a different front, maybe of

(Continued on Page 3)

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. . . Lane Planning Top-to-Bottom Review of NSF

(Continued from Page 2)

a more inter-disciplinary nature, than they have in the past.

SGR. *What effect is the economic environment likely to have on the international relations of the Foundation?*

Lane. International cooperation is even more important than it has been in past years. We must be sure that we provide the researchers in this country with access to the best facilities anywhere in the world. If they're here in this country, that's fine, and some of them should be. But they won't all be here. We know that it's increasingly difficult for us to fund large construction projects.

SGR. *The Commission on the Future of NSF left behind a report that has produced numerous interpretations. What is your reading of its recommendations?*

Lane. I think the Commission underscored the importance of basic research in science and engineering. The Commission also said, however, that there should be two reasons for supporting basic research. One being knowledge for its own sake and the advancing of understanding of nature. The second reason is the benefits that come out of the discoveries of basic science and engineering for society. I interpret the Commission language to be quite supportive of the National Science Foundation's approach to the funding of basic research.

SGR. *What changes do you think should be made here, in terms of internal procedures and priorities?*

Lane. It's a good time to have an in-depth look at the whole agency, the way it does business, for a variety of reasons, and we're going to do that. One, it's just a good idea. It's been a long time, if ever, since we've really quite had that full, comprehensive look at how the NSF works.

SGR. *What do you mean by a full look?*

Lane. I mean that we would expect to look at how the institution is managed, its resources, its personnel, the whole broad range of management issues: decision-making, structural issues, how we're organized. That's one whole set of issues. We would involve in such reviews people who actually understand organizations, and we would involve some people from outside. Certainly it would involve a visiting committee to give us advice. But I don't have a structure. I don't have something to lay out in front of you at this point. We also want to evaluate the programs. We are going to evaluate all the Centers. The Congress has asked that we review all our Center programs—the Engineering Research Centers, the Science and Technology Centers, Supercomputer Centers, Industry-University Cooperative Research Centers. And we'll evaluate other programs, but we're going to do the Centers early on. NSF does continuously evaluate itself. That's known throughout the community, and I think Congress understands that also. We have in place, and have for a long time, a mechanism for evaluating our programs by bringing in committees of visitors to look at the decisions that have been made, the people who are supported, where the money has been distributed. That is ongoing. I don't have any reason to change that. We'll look at it as a part of managing how we do business, to see whether that way of evaluating the programmatic decisions of the Foundation can be improved.

SGR. *When will this happen?*

Lane. It's going to take a while. Right now we're discussing this. I will be discussing it with the National Science Board. It will be responsive to the National Performance Review. It is consistent with the idea of reinventing government. It's consistent with some of the questions that were being asked by the Congress.

SGR. *It's been suggested that the termination of the Super Collider is not an isolated event, but reflects a broad decline in support for basic science.*

Lane. While the science was always viewed as excellent, it was science in a particular field, so it was not science that was viewed as broadly beneficial to neighboring sciences or immediately to society. The project was very expensive. It came at a time when budgets were really tight. It suffered from not having substantial international contributions early on. It does not in itself signify an anti-science movement, I believe, and should not be overinterpreted that way. But it certainly was a very unfortunate happening in science. There are folks who are quite skeptical about the value of science, how much should be invested in it. One can read a lot about that. Scholars in our universities and colleges write about this subject. But I really do not believe that's what drove the SSC. It's an expensive project. It came at a time when it was felt in the Congress that the nation could not afford it. And that's ultimately what killed it.

SGR. *You believe it was a self-contained event?*

Lane. I could not go so far as to say it was self-contained. Budgets are tight, and big science projects are vulnerable, because they're large lumps. They're expensive, and they require probably even greater justification now, in this present environment, than they might have a number of years ago. So, I wouldn't be able to see the SSC as isolated. I think there is a message there. And all of us in science need to be conscious of that.

SGR. *Leading people in many research fields have left the old Soviet Union in large numbers and have moved to the US. Some feel that's not altogether a blessing.*

Lane. We're the beneficiaries of those moves. And the nations of the former Soviet Union are at a loss there. I don't know what I would see on the horizon that would prevent that from continuing, or if it should be prevented from continuing. Certainly, as far as I know, the mathematicians and scientists who come to this country are happy with their new lives and are bringing to the US the benefit of their knowledge and experience. Some outstanding people have come.

SGR. *But there is grumbling among our researchers who can't find jobs.*

Lane. Understandably. The job prospects are very poor

(Continued on Page 4)

NIH Head Cautions on Breast-Cancer Strategy

From the keynote address by Harold Varmus, Director of the National Institutes of Health, December 14, to the Conference to Establish a National Action Plan on Breast Cancer, convened by Secretary Donna Shalala of the Department of Health and Human Services.

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.... how do we balance basic and targeted research in our efforts to control this disease with a limited amount of money? At this point, I need to give you some sense of what medical scientists mean by basic research, because the term is often taken to mean research of no practical value, or research that satisfies only the curiosity of the investigator.

This may be true in some branches of science—perhaps astrophysics or subatomic physics. But in the biomedical world, we always presume that any research we call basic could ultimately lead, through successive steps, to a practical outcome. This feature of biomedical research offers a defining principle: the immediate experimental objectives of basic research will differ from—and may even seem unrelated to—the ultimate practical objective. Retrospective analysis shows how hard it is to predict accurately the practical outcomes of basic research in our fields....

This means to me that we should continue to devote most of our efforts to a broad understanding of cell growth and function. The alternative is to decide that we now know enough about such fundamental aspects of cells that it is time to commit ourselves to improving the diagnostic and therapeutic strategies now in use or to fashioning new ones from the few pieces of the puzzle already in hand.

This is an old dilemma: should we have invested in better iron lungs or in attempts to grow polio virus? Bred better leeches or worked on the germ theory of disease?...

Here, then, are my principles—and my advice—as you contemplate our future approaches to breast cancer.

First, avoid strategies that would impair our ability to pursue the many promising avenues to a fundamental understanding of cancer.

Second, define the problem of breast cancer as broadly as possible. This will amplify the prospects for progress with any targeted funds, because it acknowledges the reality that many scientific issues impinge on breast cancer—and vice versa....

Third, attract the best minds—both seasoned and new investigators—to breast cancer research. To do this, it is not always necessary to convince scientists to change fields; often it is enough to induce them to think seriously about the implications of their work for breast cancer. In addition, we should recognize that cancer biology is now a sophisticated field of research and we should encourage graduate and post-doctoral training programs in it.

Fourth, look carefully for impediments to the transfer of new technologies to industry and to the bedside. Novel mechanisms for fostering collaborations between government or academic scientists and the private sector may ultimately be required to ensure that the findings of basic science are vigorously pursued.

Finally, lead the battles against specific diseases by discussion and persuasion, not by formation of committees and offices; in short, by inspiration, not direction.

NSF Director *(Continued from Page 3)*

for many of our young people. Morale is very poor. I don't recall a job situation like this, because everything is out of phase. The labs are not expanding, industry is not expanding, universities are not expanding. At least in times before, there was some place to go. Now, the situation is really particularly grim. I'm very concerned about this issue.

SGR. *Not too many years ago, shortages were predicted. What's your view—glut or shortage? Is this a good time for a young person to make a career choice in science?*

Lane. I don't know if we face a glut or a shortage. We have an immediate serious problem, because we have more people coming out, and already out with PhDs, who can't find jobs. That's creating terrible personal circumstances for people. If we look to the longterm, I frankly don't know how to make that kind of projection of demand. It's a difficult time for young people to make career decisions right now. And that's one of the things that troubles me so greatly, because it could well send a signal all the way down in age to young people that science, mathematics, and engineering are not a way to go. That you better go spend your lives doing something else. And then I think that undoubtedly we're going to pay for that sometime down the road.

SGR. *Is it useful to try to peer into the future in any systematic way to forecast the job market?*

Lane. I don't think it's worked very well in the past, trying to peer into the future and make any significant change based on that. If we go all the way back, back early enough, it was felt to be pretty clear that we were going to need quite a few more scientists and engineers. Universities and laboratories were expanding quite substantially. There was a time when it seemed clear that we were going to need those people, and we did. But it is dangerous to tweak the system too hard, one way or the other. I'm a kind of an adiabatic sort of a worker in most of what I do. I think we have to be careful about changes, because they can kick instabilities into the system. And sometimes the damage can be greater than it would have been otherwise. Until there's a clear reason for a substantial change in level of funding for a particular area or a particular level of education or anything like that, one shouldn't make that change.

. . . Pertussis Expected in 5 Percent of Placebo Group

(Continued from Page 1)

Both vaccine trials would be impermissible in the US because of ethical prohibitions against mass experimentation when an accepted treatment is available. In the US, pertussis vaccination is recommended by the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention and by the American Academy of Pediatrics. With pertussis vaccination mandatory in virtually all states, the vaccine is usually administered with diphtheria and tetanus vaccines—as the familiar DPT shots for infants.

Citing ethical considerations, the managers of the Italian vaccine trials initially protested the inclusion of placebo patients when NIH invited proposals for pertussis studies in 1989, according to NIH records. Nonetheless, they signed on after NIH officials insisted that a placebo group was statistically essential for determining the incidence of pertussis and evaluating the efficacy of various vaccines. The projects were approved by the appropriate ethics boards in all the countries involved, and in all cases, parental consent was reported for the infants' participation in the trials.

The American head of the projects, David L. Klein, Bacterial Respiratory Disease Program Officer, in the National Institute of Allergy and Infectious Diseases (NIAID), acknowledged to SGR last week that the trials could not be conducted in the US. But, he said, "It is not unethical to hold back the vaccines if they are not used routinely"—a reference to low levels of pertussis vaccinations in Italy and Sweden.

In August 1992, when the Italian project was discussed by an institutional review board at NIAID, a question was raised about the number of pertussis cases that would occur in the placebo group. Minutes of that meeting report the following reply, apparently by Klein: "We estimate that five percent of those in the placebo group will become ill with pertussis during the followup period of 19 1/2 months, starting 30 days after the third dose."

Pertussis, also known as whooping cough, is one of the more serious menaces to infant health. In addition to its prolonged, alarming, and painful symptoms, it can lead to dangerous and sometimes fatal complications. With a high level of vaccination, pertussis has virtually disappeared in the US. But physicians and anxious parents have raised questions about possible neurological side effects of pertussis vaccines; and uncertainties exist about the relative efficacies of traditional whole-cell vaccines and newer, bio-engineered acellular versions. (Unrelated to NIH's foreign trials, a US-based study, reported in the January 5 *Journal of the American Medical Association*, found virtually no risk of neurological illness within seven days of DPT shots administered to 218,000 children; the study, supported by the CDC, did not include a placebo group.)

NIH is thus understandably eager to find out more about pertussis vaccines, but the US turns out to be inhospitable territory for the trials it wants performed since too few infants go unvaccinated to reveal the natural level of the disease. Hence the turn to studies abroad, where US rules say it's okay to proceed if the national health authorities approve. In Italy and Sweden, pertussis vaccination is recommended but not mandatory.

The documents obtained from NIH show Italian researchers expressing concerns about placebos before yielding to NIH's insistence on their inclusion. However, after the deal was closed in April 1992 between NIH and its Italian counterpart, the Rome-based *Istituto Superiore di Sanita*, the documents show attention in Italy turning to strategies and incentives to win the cooperation of wary physicians and parents.

NIH's foreign pertussis trials were piggybacked on diphtheria and tetanus inoculations, both mandatory in Italy and Sweden. To evaluate the relative and absolute efficacy of the traditional whole-cell and acellular vaccines, the National Institute of Allergy and Infectious Diseases invited proposals to conduct trials in which pertussis vaccines would be included with the DT inoculations—except for a small percentage of recipients who would receive a placebo in place of the pertussis vaccine.

The Swedish inoculations, conducted from March 1992 to April 1993, involved 9829 infants, of whom 2600 received placebos while the others received a pertussis vaccine. In the Italian trials, from September 1992 to September 1993, 15,550 infants were enrolled, of whom 10 percent received placebos with the DT shots.

There are no reports yet on the incidence of pertussis among the placebo recipients. But in their contract proposal for the NIH project, the Italian researchers state, "We assume an incidence of laboratory-documented pertussis of 5 percent in placebo recipients over the mean followup period."

The inclusion of a placebo group was gingerly raised in 1989 in an announcement by the Institute of Allergy and Infectious Diseases seeking contractors for the projects. Among the specifications: "The capability to perform a double blind, randomized, prospective efficacy study which includes a whole cell pertussis arm, and if possible, a placebo control."

In a 110-page proposal, the *Istituto Superiore di Sanita* conformed to the NIH specifications, except on one point: "We have concluded that for ethical as well as practical reasons, a placebo group will not be possible. The first consideration is an ethical one," the Italian proposal stated. "Whole cell vaccine is currently poorly accepted by parents and physicians," the proposal noted, but added: "Nonetheless, the Ministry of Health recommends its use. For this reason, we do not feel a placebo would be ethical, however small the group would need to be. This feeling is held by a variety of USL [local health unit] health authorities and pediatric leaders whom we have contacted. It is also highly unlikely that a placebo group will be approved by human subjects institutional review boards." The proposal was

(Continued on Page 6)

. . . Mothers Expressed Suspicion of Placebo Shots

(Continued from Page 5)

signed by a group headed by Donato Greco, of the *Istituto*, who initially served as Project Director for the vaccine trials.

The proposal then proceeded to another objection—"a practical one," arising from concerns that the "presence of a placebo group would result in considerably lower rate of participation." Citing surveys on attitudes toward optional vaccines, the proposal said mothers heavily rely on the advice of pediatricians, and that the pediatricians' acceptance of pertussis vaccine dropped from 80 percent to 40 percent when "asked whether they would participate in a trial with a placebo group."

Though conceding that successful use of a placebo would improve the statistical quality of the study, the Italian proposal concluded that a more practical alternative would be a "control group drawn from those who refuse participation in the trial and elect to be vaccinated with only the obligatory DT vaccines."

NIH, however, remained adamant on the placebo, and the Italians caved in. In January 1992, Greco stated in a memo to NIH that "we realize that a placebo group would be extremely useful in comparing vaccines and data between trials." He added, however, "For both ethical as well as practical reasons, we would prefer to have as small a placebo group as possible and would opt for the lowest ratio of vaccinated to placebo that would still provide an acceptable study power."

About 10 percent became the working figure for placebo participation, and by September 1992, the issue for the Italian researchers was not whether but how to incorporate a placebo into the NIH-financed trial. A revised proposal from Greco and colleagues stated: "In response to NIH and FDA concerns about the extreme importance of a placebo group and our concern that participation would be adversely affected by addition of such a group, we undertook a series of four focus groups [of mothers] guided by a group of psychologists trained in this discipline.

"The mothers were enlisted in three USLs [local health units] in Rome and one in a small town outside of Rome.... The purpose of the study was two-fold: to determine mother's response to the idea of a placebo group and to determine how best to introduce the trial to the mothers."

The focus proceedings revealed that the mothers were "highly concerned about the inclusion of a randomized placebo group. There were no apparent differences in attitude by age, parity, education, and by type of person who would present the trial to them (nurse, pediatrician, etc.)."

From a reading of the revised Italian proposal, it appears that the mothers were reflecting rationale concerns. Cited were "the randomness of the administration or non-administration of the pertussis vaccine, the fact that they would not know whether their child had been vaccinated or not, and the increased risk of pertussis to which they might be exposing their child if all the other children had gotten anti-pertussis vaccine.... These feelings were exacerbated by the belief that pertussis is a particularly severe illness. Mothers were willing to participate in a trial if they can be assured that their child will receive an anti-pertussis vaccine."

The proposal then discussed steps, in progress or planned, for persuading the mothers to sign up for the vaccine trials. "Much of the emphasis will be placed on convincing the pediatric community to urge their patients to participate.... A number of articles have been prepared for the pediatric literature and for pediatric newsletters that have a broad circulation.... We also intend to involve the medical and lay press in publicizing the trial, and we have already begun working with one of the leading medical journalists in the country, as well as with the press officer at the [*Istituto*]."

The role of nurses in recruiting for the vaccine trials was emphasized in the Italian proposal. Stating that the nurses would be required to take a training course that included "convincing the mothers to participate," the proposal noted that the nurses would "meet with each mother bringing her child to the first compulsory immunization and will be responsible for obtaining informed consent." The proposal also noted a special inducement: "Mothers will be given the added incentive of special health attention that will hopefully increase the likelihood of their participation."

After several revisions, an informed consent form was finally developed for the vaccine trials. Three single-spaced typed pages (in English translation), it speaks ominously of the dangers of pertussis and the benefits of vaccination, and then goes into the organization of the trials, which it states "consists of a comparison between a traditional anti-pertussis vaccine and two new anti-pertussis vaccines."

The only reference to a placebo group states that "10 percent will receive a DT vaccine currently licensed in Italy which provides no protection against pertussis." The form also states that "while 5 percent of unvaccinated children develop pertussis, we expect only 1.4 percent of participating children to come down with pertussis"—an accurate but misleading statement based on the total number of children in the trials, rather the number in the placebo group; for the latter, the potential for pertussis remained unchanged, at 5 percent.

Several critical comments were made about the informed-consent materials at the August 1992 meeting of the NIAID institutional review board, including one reported in the minutes as follows: "The suggestions that the vaccine represents a *considerable* advancement, and that the child will receive the new vaccines *before they are available on the Italian market*, sound like a commercial."

The response, again apparently by Klein: "Some of the comments are things that we have discussed with the Italians. They are very wary of scaring parents away from participation. We are treading a fine line between making statements that might frighten parents and giving parents a clear idea of the risk involved."—DSG

In Print

(Continued from Page 8)

NSF programs, priorities, anxieties, etc. The cast of Congressmen, NSF brass, and outside witnesses will be somewhat different when the show returns this spring, but old issues remain: not enough money and how should NSF relate to industrial research.

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Council for Agricultural Science and Technology [CAST] Publications Catalog (12 pp., no charge), lists reports, issue papers, commentaries, etc. produced by CAST, an association of scientific societies, academic and industrial organizations, etc., founded in 1972. Among recent publications: ***US Agriculture and the North American Free Trade Agreement*** (41 pp., $10); ***Admissible Scientific Evidence in Court*** (4 pp., $2), and ***Pesticides in the Diets of Children: Scientists' Review*** (20 pp., $5).

Order from: Council for Agricultural Science and Technology, 4420 Lincoln Way, Ames, Iowa 50014-3447; tel. 515/292-2125; fax 515/292-4512.

Report of the FASEB Consensus Conference on FY 1995 Funding in the Biomedical and Related Life Sciences (32 pp., no charge), annual wish list of the Federation of American Societies for Experimental Biology, whose 41,000 members are sensibly fixated on the fiscal fortunes of the government agencies that support much of their research. Perhaps because funding for the coming year is tightly wedged by deficit-reduction requirements, FASEB is modest in its hopes for NIH, suggesting a mere 8.9 percent increase over the $10.9 billion appropriated this year. (The word is that Clinton will request a touch under 5 percent. Congress will add to that, but a boost beyond 3-4 percent would be difficult.) For agencies financed in modest millions, however, FASEB would be a free spender, seeking, for example, a doubling of funds for the Environmental Protection Agency's Office of Exploratory Research, and a 62 percent increase for competitive research in the Department of Agriculture. The report contains a useful bibliography of recent major science-policy publications.

Order from: Federation of American Societies for Experimental Biology, Office of Government Liaison, 9650 Rockville Pike, Bethesda, Md. 20814; tel. 301/530-7075; fax 301/530-7190.

Aerospace Facts and Figures 1993-1994 (176 pp., $25; DC residents add 6 percent sales tax; plus $4 for shipping in US and Canada; $7 elsewhere), from the Aerospace Industries Association, copious statistics on civil and defense production, travel, exports, employment, salaries, R&D, etc.

Order from: Aerospace Industries Association, 1250 Eye St. NW, Washington, DC 20005-3924; tel. 202/371-8561; fax 202/371-8470.

Global Change Research and NASA's Earth Observing System [EOS] (GPO Stock No. 052-003-01358-4; 45 pp., $3.25, plus 25 percent for international orders), from the Congressional Office of Technology Assessment (OTA), a review based on a workshop held last February in response to various misgivings about the multi-agency organization and strategy of global-change research and particularly NASA's mega-role through the EOS, capped by Congress at $8 billion for the 1990s. OTA says that, as now structured, the global-change research program "will not be able to provide decisionmakers and natural resource managers with the information they need to respond to global change." Noting the political lure of mega-projects, OTA states, "NASA has been able to attract large amounts of funding for its Earth Observing System; however, potentially cost effective but less glamorous programs outside NASA have languished."

Order from: Superintendent of Documents, USGPO, PO Box 371954, Pittsburgh, Pa. 15250-7954; tel. 202/783-3238; fax 202/512-2250.

Whistleblower Protection: Reasons for Whistleblower Complainants' Dissatisfaction Need to be Explained (GAO/GGD-94-21; 44 pp., no charge), from the General Accounting Office (GAO), a finding that boat-rockers in the federal bureaucracy think poorly of the Office of Special Counsel (OSC), created in 1989 to investigate their charges of wrongdoing in their workplaces and protect them against reprisals. Reporting, on the basis of a survey "a high level of dissatisfaction with OSC"—even among successful whistleblowers—the GAO report says that "76 percent of the respondents believe that OSC generally acted or primarily acted in the interests of the agency, rather than in the interests of the complainants or neutrally, while investigating the cases."

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20884-6015; tel. 202/512-6000; fax 301/258-4066.

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In Print

Official reports and other publications of special interest to the research community

(Copies of publications listed here are available from the indicated sources—not from SGR)

Projections of Education Statistics to 2004 (GPO Stock No. 065-000-00608-1; 172 pp., $13; $16.25 for foreign orders), from the National Center for Education Statistics, US Department of Education, 23rd in a series started in 1964, presents past, current, and projected statistics on student numbers, staffing, budgets, graduation rates, etc. in elementary, secondary, and higher-education. A central point, with implications for all levels of education: elementary and secondary enrollments are continuing the increase that began a decade ago after declining from 46.7 million to 44.9 million between 1979-84. The projection for 2004 is 55.7 million, 16 percent above 1992.

Order from: Superintendent of Documents, USGPO, PO Box 371954, Pittsburgh, Pa. 15250-7954; tel. 202/783-3238; fax 202/512-2250.

Congressional Action on Research and Development in the FY 1994 Budget, from the American Association for the Advancement of Science (78 pp., $14.95 for AAAS members, $17.95 for others), a concise, agency-by-agency review of Presidential requests and final Congressional actions in R&D appropriations for the current fiscal year, which began October 1. Included is a government-wide overview and discussion of federal R&D policy issues and changes in Clinton's first year.

Order from: AAAS Distribution Center, PO Box 521, Annapolis Junction, Md. 20701; tel. 1-800/222-7809.

Technology Policy Implementation Assessment (15 pp., $7.50, plus $1.50 for shipping, prepaid orders only), a middle-ranking report card on President Clinton's tech policies by the Council on Competitiveness, Washington-based combine of high-tech industry, big academe, plus a few others. The Council credits the Administration with "major progress" in expanding extramural programs run by the National Institute of Standards and Technology, in raising the NSF budget, and shielding joint-production ventures from antitrust liability. But in other areas, including tax policy, research coordination, and redeploying the national labs, the progress ratings ranged from "moderate" to "insufficient." The Council is influential because of Clinton's electoral need to woo big business away from its traditional Republican orientation.

Also from the Council on Competitiveness: ***Competition Policy: Unlocking the National Information Infrastructure*** (25 pp., $25, plus $1.50 for shipping), says the rapid pace of technological change in information systems defies predicting "which technologies will succeed, which of the proposed mergers will work, or which products and services the market will demand." Because of this, the Council states, deregulation is the way to go, with emphasis on interconnectability among networks, removal of barriers to market entry, market-place price-setting, and universal service. Council President Paul Alliare, CEO of Xerox, says the statement represents a first in achieving consensus among long-distance and local telephone companies, other access providers, cable companies, academic institutions, labor unions, and public-interest groups. The report was produced by a committee co-chaired by John Young, former CEO of Hewlett-Packard, and Charles Vest, President of MIT.

Order from: Council on Competitiveness, 900 17th St. NW, Suite 1050, Washington, DC 20006; tel. 202/785-3990; fax 202/785-3998.

Opportunities in the Nutrition and Food Sciences (310 pp., $36.95, plus $4 for shipping), from the Institute of Medicine (IOM), health-policy arm of the National Academy of Sciences, a call for more federal and private support and political attention for nutrition research, described as skimpily financed and in real decline from the levels of recent years. Total federal spending in this area is estimated at $421 million in 1991, and slipping. The report, over two years in preparation, says food research should be enthroned as one of those high-flying Presidential initiatives, like global warming or high-performance computing. Noting that the New Year brings the 25th anniversary of the first, and so far only, White House Conference on Food, Nutrition, and Health, the report urges a second conference this year to spotlight the benefits of nutritional research and the neglected scientific opportunities. The report was produced by a 22-member committee chaired by Richard Havel, Professor of Medicine, UC San Francisco. Paul Thomas of the IOM staff served as Project Director.

Also from the National Academy of Sciences: ***Information Technology in the Service Economy: A Twenty-First Century Lever*** (270 pp., $29, plus $4 for shipping), notes wonderment about whether there's been a commensurate payoff in productivity from the more than $750 billion spent over the past decade by private and public organizations on computers, software, and other information technology. Yes, indeed, even if it doesn't show brightly in standard economic measures, says the Academy's Committee to Study the Impact of Information Technology on the Performance of Service Activities. The difficulty, says the report, is that the productivity gains from information technology employed in services are often too subtle or elusive for the antiquated measurement techniques still in use. James B. Quinn, Professor of Management, Dartmouth College, chaired the Committee. Marjory S. Blumenthal served as Staff Director.

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 1-800-624-6424; in Washington, DC: 202/334-3313.

1993 National Science Foundation Authorization (GPO Stock No. 552-070-15546-5; 266 pp., $10), text of annual hearings last May and June before the Science Subcommittee of the House Science, Space, and Technology Committee on

(Continued on Page 7)